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ABSTRACT

This paper discusses challenges to the European Association of Distance Teaching Universities (EADTU) in using technology. The first section deals with external challenges to EADTU institutions, including competition from new services, new funding programs, pressure from national governments, and the Europeanization of education. Internal challenges are identified as the need for clearly defined policies regarding transborder activities, low use of technology in member institutions, communication between member institutions (postal services, courier services, telephone, telefacsimile, face-to-face meetings, and audioconferencing), joint course production, transborder delivery of courses, and European-wide course design and delivery. Requirements for member institutions indicated by these challenges are summarized: greater use of established technologies; development of new course designs that exploit new technologies; and development of better communications systems between EADTU institutions. Four references are listed. (MES)

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EUROPEAN ASSOCIATION OF DISTANCE TEACHING UNIVERSITIES

THE CHALLENGE OF TECHNOLOGY FOR EUROPEAN DISTANCE EDUCATION

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Introduction

It is not uncommon for academic staff, even in distance teaching universities, to sigh heavily when the subject of using new technology for teaching their courses is raised. For many, media and technology are gimmicks which at best merely distract academics from their research and teaching, and which at worst interfere with the student-teacher relationship or even add to costs and time in producing courses.

I have a great deal of sympathy for such views. These days the only thing more fashionable in education than open learning is the use of technology for teaching. Was it possible that anyone managed to learn anything before the days of artificial intelligence, laser discs, hyper-text, CD-ROMs, satellites, and so on? It is not surprising that scholars of literature and linguistics, of physics and philosophy, fear that they are in danger of being steamrollered into activities for which not only are they as teachers untrained and unskilled, but also for which there is no real evidence of effectiveness.

At the same time, there is sometimes a guilty suspicion that possibly these new technologies may be better at teaching, that other organisations may be getting more resources and more support as a result of being more innovative, and that, heaven forbid, we may be somehow 'left behind'.

The truth, as always, is somewhere in-between. Media and technology are no panaceas for distance education. Indeed, there are major limitations and difficulties in using technology which tend to be conveniently forgotten by enthusiasts and funding agencies, and I intend to bring some of these 'challenges', as the Americans would put it, out into the open later in the paper. Nevertheless, despite these problems, new developments in technology and the interest and financial support they attract do offer genuine opportunities for distance education in Europe. Indeed, I shall argue that unless the challenge of new technologies is faced, the very existence of EADTU institutions will be under threat.

External challenges to EADTU institutions

Competition from new services

With regards to technology, distance teaching universities (DTUs) are like the public telephone companies (PTTs). They both already have a heavy investment in well-tried 'older' technologies and services. For PTTs, there is the terrestrial telephone networks, the millions of miles of trunking and cabling, the telephone exchanges, and the methods and services used to operate and maintain universal inter-connections across the world. For the DTUs, there is print, radio and broadcast television,

elaborate systems of course design, publishing and production, registration and assessment systems based on postal services, and extensive field support for students at a local level.

But just as for the PTTs new technologies such as computers, fibre-optics and satellites bring with them not only opportunities to expand or improve existing services, but also threats of new competition and new regulatory environments, so too the DTUs are faced with new competitors, new governmental and inter-governmental initiatives, and new pressures from the increasing availability of new technologies.

As laser disc, satellite and computer technology develops, as companies in Europe face up to the challenge of improving training, management and job development for work-forces increasingly dispersed across Europe, and as the European Commission, through programmes such as COMETT, DELTA and DEUCE, provides resources for the development and application of learning technologies, so we will see new organisations and initiatives being created to exploit the opportunities these developments will bring. Thus, in the last 12 months we have seen the establishment of two new major European-wide institutions concerned with distance teaching: EuroPACE and EUROSTEP, using satellites and also other 'new' technologies, such as computer conferencing. In the USA, the Electronic University is based primarily on computer-conferencing, and the National Technological University on satellite television. In Europe, we shall see in the next few years several more new distance teaching initiatives based primarily on emerging technologies, what Søren Nipper (1989) has called 'the third generation' of distance education (the first being correspondence teaching, and the second multi-media teaching).

If the existing DTUs do not respond positively to the challenge of these new technologies, they could well lose students and government support to these new initiatives.

New funding programmes

Mention has already been made of several major funding programmes from the European Commission, such as COMETT, DELTA, DEUCE, LINGUA, ESPRIT, RACE and ERASMUS, all of which have direct relevance for our own institutions. The importance of these programmes cannot be too strongly emphasised. They provide much needed resources for educational institutions under strong financial pressure from their own governments, and provide opportunities for trans-border activities which otherwise would not exist. They are a marvellous stimulus to innovation and technological development for learning and teaching.

But they also have dangers as well as benefits for EADTU institutions. Although support for EADTU activities has been heartening to date, we have no exclusive claim to these funds for distance teaching activities. If we do not meet the criteria - or even if we do - other institutions whom we may see as hitherto insignificant players in the distance education game are also eligible for funding. Furthermore, the policy and agenda either explicit or implicit in the EC's programmes are not always in harmony with the policies and agenda of individual EADTU institutions. In particular, activities within national borders need to be developed at least as urgently as trans-border activities, particularly in the field of new technologies. Effective communication with our own students and staff within our own countries is more important than trans-border communication with other institutions. For this, we must look to our national sources of funding, and the development of *national* technological infrastructures for our teaching. I fear that the availability of European funds is actually distracting staff in our institutions from implementing technological developments nationally that would be of more direct benefit to our students.

Also, there is a strong 'technological push' in most of the Commission's funding programmes. While understandable at a strategic industrial level, there are many obstacles to effective distance education that do not require technological solutions. For instance, credit transfer is a crucial but highly complex problem which is best sorted out through many meetings and inter-change of staff (although even here technology can play a useful if minor role, through for instance the creation of remotely accessible data-bases and audio- or video-conferencing).

Thus while European funding programmes bring many benefits for distance education, the obligation still remains with national governments and our own institutions to ensure that the needs of our internal students are being well served through technological innovation.

Pressure from national governments

In several member countries national governments are putting pressure on higher education institutions to reduce costs and to increase effectiveness. While in some countries DTUs have been slightly more protected than conventional universities, some governments are still expecting DTUs to increase their activities in terms of courses, student numbers or new target groups, but with less than proportional increases in public funding.

Furthermore, politicians tend to believe that increased use of technology automatically leads to increased cost-effectiveness. As Chris Curran warns in the following paper, this is not necessarily so in education, particularly, as in the case of DTUs, where student-to-teacher ratios have

been historically far greater than in conventional universities. Greater cost-effectiveness due to the introduction of new technology is less likely to be so dramatic in DTUs because new technologies are likely to replace older technologies, rather than lead to major reductions in labour costs.

Also, a feature of technological innovation is that it requires greater rather than less expenditure initially, because of the need for investment in capital goods and training. There is evidence that several of the member EADTU institutions require considerable investment if they are to provide a modern technological infrastructure for their distance teaching. This is not a message national governments like to hear.

Nevertheless, it still remains true that it is often easier to obtain capital funding, e.g. for equipment, than recurrent funding, e.g. for staff, which makes it easier to get funds for technological developments. Again, though, there is a tendency to underestimate the human resources required to make the technology effective in an educational context. There is no point in buying computers for students if there are inadequate funds to develop appropriate educational software to run on them.

There is therefore a slight contradiction in the pressure from governments for both increased use of technology and reduced costs in distance education.

The Europeanisation of education

This of course is the challenge of 1992. What impact will it have on EADTU member institutions, and in particular what are the implications for use of media and technology?

Already, at least two developments can be clearly identified. The first is the need for education and training *about* 1992 and its implications for industry and culture in Europe. This means the provision of courses, and the EADTU is already responding to this need.

More relevant to the technological implications is the need to be able to deliver education and training to students across Europe. From 1992, a student registered initially with, for instance, the British Open University could easily find herself working one year in Manchester, the next in Milan, and the third in Toulouse. This may be because the company she works for moves her around, or because her profession takes her to different jobs in each of these cities. Companies with centres all over Europe will need to deliver training to all those centres, often from one central point. Many distance education students will no longer be nationally based - so how will national institutions deliver courses and provide field support across national frontiers?

It can be seen that even if the EADTU member institutions wanted to stay still or consolidate, external pressures will increasingly make this difficult. The next 10 years will see major changes in the climate of distance teaching in Europe, and those institutions that do not adapt will go the same way as the brontosaurus.

Internal challenges to EADTU institutions

External developments are to a large extent outside the control of member EADTU institutions; however, there are also major challenges within the control of EADTU institutions that need to be addressed.

The need for clearly defined policies regarding trans-border activities

Each institution needs to decide where it stands regarding trans-border activities; it needs a policy. For instance, will courses be available to nationals living in another European country or not? Will *anyone* in another European country be allowed to enrol? Will they be charged the same fees as people living within the national area? How will students outside the national area be supported? How will this be funded?

Since several member institutions are already developing policies in these areas, perhaps of more significance is the issue of competition or co-operation. For instance, will an EADTU institution compete for students with another EADTU institution in the latter's own territory, or will they work in co-operation? Will they do both, and if so, under what circumstances does one compete rather than co-operate? And who decides - individual professors or course teams, or the institution as a whole?

The problem is that it is impossible to make sensible decisions about the use of media and technology, at least for trans-border communication, until such policies have been decided. For instance, in my own institution, the value of using satellites depends entirely on what our policies will be regarding European activities. At the same time, the technological 'windows of opportunity' are being opened now, and if we wait too long those windows will be closed when we want to use them.

Low use of technology in member institutions

One should not be misled by the impressive range of contributions to this book. There is more talk than action about the use of technology in distance education. Even in the most technologically advanced of our member institutions, print, correspondence, and face-to-face teaching still predominate. For most European distance learners, these are still the only media currently that really matter.

Furthermore, the use of media and technology for teaching varies considerably between EADTU member institutions; indeed, even where it does exist in some institutions, it is no more than a gesture, a marginal activity whose main purpose is to show that something is being done. Even audio and television - the basis of Nipper's 'second generation' of distance teaching - are either not used at all, or are merely marginal, in many of our institutions. Thus there are already huge differences between members, and there is a strong possibility that the introduction of even newer technologies by the richer or bigger institutions will merely increase these differences.

A few member institutions - I include my own here - have made serious attempts to introduce 'third generation' technologies such as computer conferencing and video-discs into their teaching. However, even these institutions have found it impossible to make these new technologies *central* teaching media. Where they have been tried in our institutions, 'third generation' technologies have rarely replaced existing technologies - they have merely become *additions* to the original teaching programme, and as such have become marginalised; at the same time, they have led to increased costs to the institution and the student, and an extra burden on the student work-load.

It takes a great deal of time for a new technology to work its way into a central teaching role. For instance, the only new technology introduced by the British Open University in the last 20 years that has penetrated more than a quarter of its courses, is the humble audio-cassette, largely replacing radio. The video-cassette is likely to join the audio-cassette in the next few years, replacing broadcast television on probably still a minority of courses. Home computers will be next, but still only for a minority of courses and students, at least within this century, and it is not yet clear what, if anything, home computing will replace.

Although I have often been personally frustrated by the slow rate of innovation within my own institution, I think it is important to stress that this is not necessarily a bad thing. For a start, at least some of our institutions are still certainly more advanced in terms of the number of students and courses served by technology-based teaching than any other institutions in Europe or indeed the world. For instance, we are well ahead of conventional universities or even most industrial training, both in the range and the quality of media and technology used. Secondly, our primary purpose is not research and development, but effective teaching. It is wrong to experiment with students, just for the sake of demonstrating technology. We have to be quite sure that there are clear advantages before making major changes in our ways of teaching.

There are good reasons why technological development has been so slow in EADTU institutions. Print and face-to-face teaching (at a local level)

are well-tried methods that have served distance education well. The use of more advanced technology can be justified only if it meets one or more of the following criteria:

- lower cost;
- greater teaching effectiveness;
- increased accessibility to students.

These are proving hard criteria to meet, so it is not surprising that there is still major academic and management resistance to the use of new technologies in most of our member institutions.

There is then a long way to go before any of our institutions can be considered to be 'third generation' distance teaching institutions. However, there is a possibility for some of our members to make a technological leap over 'second generation' technologies straight into 'third generation' technologies if they wish; indeed, I suspect it will be easier for new, small or less well-funded institutions to do this than for the bigger, more technologically advanced members, because of the latter's institutional inertia and prior investment.

Communication between member institutions

Nothing more clearly illustrates the difference between the hype about new technology and the reality than the problem of communication between member institutions. I write from bitter experience in organising the workshop, and it is more than relevant to list the current problems of communication across Europe.

Postal services If one wishes to post information to every member institution, the minimum time required to *guarantee* delivery to each institution is 14 days (to this should be added the time taken *within* an institution to get the letter to the right person, which can also take two to three days in some of our members - even then, the recipient may not be in for a week). This means that in order to get a reply to a request for information, we must allow 28 days minimum. Allowing for time for individuals to respond, we are talking about a minimum of six weeks. This is clearly unacceptable for activities likely to be on-going over a period of time, such as course development, negotiations over course transfer, etc.

Courier services While usually relatively fast (3 days is however not unrealistic to guarantee delivery) courier services are extremely expensive, especially for sending multiple copies or weighty documents, and can be justified only for single activities or extreme urgency.

Telephone The telephone is still a frustrating means of communication across Europe, not so much for technical reasons - although in some cases these still exist - as for social reasons. Problems encountered were:

- *people were not in their office*: this is a major problem in the academic world, not helped in those institutions where due to government cuts there is no secretary or answer-phone. In a surprisingly large number of institutions, secretaries work only half-time. Even where there is a secretary or answer-phone, the problem is merely reversed, with the person called unable to get the person who left the message because he is out!

- *time differences*: this affects some countries (e.g. Portugal, Britain, Ireland) more than others. For some countries, Britain does not start work until 10.00 am. Lunch can extend from 12.00 (national time) to 3.00 pm (overseas). It is not just a question of starting, finishing and lunch times not co-inciding. Lines to some countries seem to be constantly engaged in the mornings, which is particularly difficult when the offices are closed in one institution at 3.00 pm (2.00 pm from some countries)!

- *language*: while this is not as great a problem as it might be between academics and administrators, it is a problem in some institutions (especially my own) at switchboard and secretarial level. It is unrealistic for some of our institutions to try to recruit multi-lingual secretaries, given current salary scales; it is though becoming increasingly important for academics and administrators to be able to speak at least two European languages, and our institutions do need to think about providing suitable opportunities for language learning for staff engaged or likely to be engaged in European activities.

Fax (facsimile; telefax) The most convenient means - at least in principle - of getting textual information to member institutions is by fax, since this usually arrives the same day in which the message is sent. However, I could not believe the difficulties I encountered in using fax to communicate with colleagues in other institutions:

- a surprisingly large number of member institutions do not have a fax machine;

- fax becomes expensive for sending 10 pages or more, particularly across multiple sites;

- lines for fax machines doubling as voice lines, or connected to an answer-phone; the fax operator cannot tell whether the number is wrong or the line merely engaged;
- fax machines switched off, either when the office closes, or because someone has forgotten to switch on the machine on arrival at work;
- messages received are not collected or efficiently distributed.

These are really simple problems to put right, as follows:

- every member institution should have a fax machine, whose number is listed in the EADTU directory;
- every fax machine has a dedicated line, which must not be used for other purposes;
- every fax machine is switched on 24 hours a day;
- every fax machine has an operator responsible for transmitting and distributing messages

Even if fax is used more sensibly, it does not get over the problem of sending large quantities of information between several institutions. This is why electronic mail and computer conferencing are important developments for inter-institutional communication as well as for distance teaching.

Face-to-face meetings This is the most favoured method of communication to date, for a number of reasons. In my view, while there will always be a need for some face-to-face meetings, particularly when people are communicating for the first time, or where there are serious differences of opinions, we *must* find alternative ways to work together, because of the costs.

If we cost in the time spent travelling to and from meetings, a three-hour meeting in continental Europe will cost a British institution approximately £1,000 per participant. The cost is calculated as follows:

• air-fare and other travel:	£250
• accommodation and meals (1 night, two days):	£100
• academic time: 2 days @ £325 per day	£650
Total:	£1,000

Since in the UK Open University this is the equivalent of the marginal cost of six students, each meeting in effect deprives six students of a

course place. Furthermore, costs fall unequally on institutions. Participants in meetings from Spain, Italy, Greece, Portugal, Ireland and Norway have far higher costs on average than participants from Belgium, France, Holland, and Germany, for two reasons. Distances travelled are usually longer, requiring more overnight stays; and air-fares per mile are often higher.

Audio-conferencing Meetings can be arranged by telephone so that each participant is located in his or her own office, but can hear and speak to each or all of the other participants. The cost of linking up 13 sites across Europe for a three-hour meeting (e.g. for the Working Group on Media, Methods and Technology) would be approximately £1,200, or approximately £100 per participant. For a course team with members on 6 different sites, the cost would be about £600. This is up to one-tenth the cost of a face-to-face meetings. However, there is still a need to ensure that the necessary accompanying documentation is prepared and distributed in advance, and some training, particularly of the chairman, is required. Such meetings need careful preparation by all participants (so carry hidden costs) and can be extremely tiring (use of a loud-speaking telephone and hands-free microphone is essential).

It can be seen that if we rely on traditional methods of communication, especially travel, we have to ask the question: can we afford European co-operation? Clearly, newer and better methods of communication must be used.

Joint course production

A key area of the EADTU's activities will be in the area of joint course development, and I hope to show that the use of advanced communications technology for inter-institutional communication is likely to be essential if courses are to be developed quickly and to a high standard.

However, as always, before an appropriate technological solution is found, policy needs to be defined. In the case of joint course production, we need to consider very carefully what *models* of course production are likely to be most appropriate, particularly since experience shows that there are clearly major differences between member institutions in their internal approaches to methods of working. There seems to me to be at least three possible models for joint course production:

- *adapting existing courses or materials*: in this model, already existing materials, perhaps from several institutions, are adapted for use in another member's institution. This is, on the surface, the cheapest and easiest model, although there are likely to be major language, cultural and pedagogic

problems in adapting the materials (see Calvert, 1986, for a good discussion of these issues). From a communications point of view this is probably the least troublesome model, since once the original materials are identified and delivered, all adaptation is done locally;

- *shared responsibility*: in this model, a new course is created, but individual institutions are responsible for only a part of the course. There is a need for all the partners to agree and define carefully the content of the whole course, the media to be used, and which institution is responsible for which part of the course. From that stage, each institution works relatively independently, and is probably also going to be responsible for delivery and support within their own country. Such courses are likely to have difficulties with coherence and variations in academic level, as well as differences in quality between different parts. If this is to be avoided, there will be considerable demands on communication services between member institutions, both at the stage of agreeing content and responsibilities, and as material becomes developed, particularly if it has to be approved and translated by other institutions.

- *integrated team approach*: in this model, all those contributing to the course work jointly throughout the development of the course. Although individual academics will have responsibility for certain parts or components of the course, all members of the team will be involved in approving and commenting on components as they become developed. This is the model most likely to lead to high quality, coherent teaching materials acceptable to all the participating institutions, but it requires a great deal of communication between course team members, involving many meetings, and continuous exchange of materials. Under current conditions, this is likely to be extremely expensive and time-consuming.

These of course are idealised models, and joint courses in practice are likely to mix some of these approaches. Nevertheless, the issues of quality, coherence, speed, consistency, adaptability of materials, and cost-effectiveness are crucial factors for joint course design and production if the EADTU members are to maintain their academic credibility. These are not technological issues, but appropriate use of communications technology will be essential if these standards are to be achieved. The real concern is that in order to keep costs down, quality will suffer.

Trans-border delivery of courses

There are two quite different ways in which courses may be delivered across national boundaries in Europe: the first is when one distance teaching university making its courses available to students in another country; the second is when courses jointly produced or adopted are made available in several countries simultaneously. Either way, such courses need to be delivered and supported locally. However, as soon as courses are made available across national borders, technological challenges arise.

Print The main problem is not so much technological delivery, but languages. Assuming that the courses need to be translated (which will not always be the case), where will this be done, and where will the materials be printed? Whatever the decision, it is likely that courses needing translation and/or delivery across borders will need to be ready much earlier than national courses.

Television This is probably a clearer example of some of the problems in trans-border delivery. Each European country varies in its method of distributing television. In the United Kingdom, the Open University uses terrestrial broadcasting and video-cassette distribution to homes; in the Netherlands, the Dutch Open University uses video-discs delivered to local centres; in Ireland, video-cassettes are distributed to local centres. Satellites will allow common delivery across frontiers, provided though that students have access to satellite transmission. This will be less of a problem in Belgium and the Netherlands, where the majority of homes are cabled, and therefore are likely to relay the satellite transmission. In some countries, though, the DTU will not have access to national terrestrial transmission, and students are less likely to have video-cassettes or cable and satellite facilities. Also, video-cassette distribution becomes expensive when large numbers are involved. Lastly, and perhaps more importantly, to obtain the pedagogical advantages of broadcast television, video-cassettes or video discs, different styles of production are required.

Home computing Even more than television, cost is likely to be a major problem regarding delivery of computer-based learning, at least to students' homes. In addition, there are difficulties in standards. At the British Open University, even using a very restricted specification for home computer equipment, including a single operating standard, software had to be developed in seven versions to account for differences between just two manufacturers of the hardware, and between colour and monochrome screens, and hard discs and floppy discs. These problems will be multiplied when national borders are crossed. For instance, keyboard layout is different, depending on the prevalent language, even for the same manufacturer.

Implications for European-wide course design and delivery

I hope I have given enough examples to show that it would be foolish merely to extend national methods of course design and delivery to European-wide courses. If we are serious about producing cost-effective joint courses for use across Europe, we will need to:

- rethink the way we design courses;
- rethink the way we deliver courses;
- rethink the way we support courses.

There is not space here to develop how this might be done. Elsewhere (Bates, 1988), I have speculated about the technologies most likely to be useful for European-wide distance education, and in another paper (bates, 1989) suggested a framework for media selection and prototype course designs based on some of the newer technologies. However, what is required is for course teams to define their target groups and content areas carefully, to look at the range of new technologies now available, and to develop new course design structures which meet the very demanding needs of European-wide course production and delivery. Successful courses meeting these needs will in my view almost certainly look very different from any existing courses offered on a national basis.

Implications for member institutions

The analysis of challenges just presented indicates a number of requirements of member institutions:

- for some institutions, greater use of 'established' technologies, such as television or video-cassettes, to improve the quality of the teaching of national courses; one aim of this book is to indicate how this has been done already;
- the development of new course designs that exploit some of the new technologies, such as satellite TV and computer-conferencing, both nationally and for European-wide courses;
- development of better communications systems between EADTU institutions, for two reasons:
  - to increase contacts and understanding between staff with similar professional interests;
  - to make it easier to produce and deliver joint courses at a distance.

In order to survive, EADTU institutions will need to meet the technological challenge, not by rushing blindly into 'pilot' courses based on the latest technological fashion, but by carefully modifying course designs so that the newer technologies are used to widen rather than restrict access, and to improve the quality and cost-effectiveness of the teaching, rather than to save money. This will require a more cautious and slower approach to the application of new technologies; at the same time, it would be even more foolish to ignore new technological developments. If we do, others will not, and we could find ourselves without students or government support.

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